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Cost – Benefit Analysis of a Frisbee Disc Course
at Ambush Park in Benson, Minnesota

Abby Fragodt

Fragodt: Frisbee Disc Course

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Cost – Benefit Analysis
Professor Paul Kivi
May 4, 2014

Cost – Benefit Analysis of a Frisbee Disc Course at Ambush Park in Benson, Minnesota

Introduction and Research Question

Ambush Park is spacious, scenic, family-friendly park near the Chippewa River, golf course, and outdoor swimming in my hometown of Benson, Minnesota. The park is used for many things, including volleyball, mini-golf, shooting baskets, playing horseshoes, as a play ground for kids, as a gathering place for reunions and community/family celebrations at one of two sheltered picnic areas, or to just spend some time enjoying the open space and outdoor beauty. One of its main uses, and the main source of revenue for the park, is for its many campsites, most of which are equipped with electricity and water. We have many visitors coming to Ambush Park every spring, summer, and fall, but I have always felt there is room for more campers at Ambush Park, along with an opportunity to increase the usage of the park among other residents of the community who may not otherwise take the time or have the current interest to visit the park.

In the middle of the park is a large plot of land that could possibly be used for future development, but will probably stay idle for many years to come. There are many possibilities as to what Benson could do with this unused land; they could put in more playground equipment, make more camping sites, expand the flower garden, or do nothing and leave it as it is. There seems to be a growing trend of building Frisbee disc courses not only in the entire United States, but especially in Minnesota, and I think the Benson community could use this opportunity to

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build a Frisbee disc course in this available area of land, which would attract more people to Ambush Park, as well as bring additional people into the Benson area to spend more money. Throughout the past few years, I have heard many people bringing up the idea of a Frisbee disc course, including my own family members, and I wanted to see if it would actually be a good use of the extra land at Ambush Park, or if it would be better to just leave the land unused.

My main research question is, therefore, would putting in a Frisbee disc course be the best use of the extra land at Ambush Park, and a benefit to the entire community? Since this project has not yet happened, and may not ever happen, my analysis will be ex-ante. The following cost-benefit analysis will include the steps outlined in the textbook *Cost – Benefit Analysis Concepts and Practice* by Boardman, Greenberg, Vining, and Weimer. The steps include: specifying the set of alternatives, standing, identifying the impact categories, predicting the impacts, monetizing all impacts, discounting benefits and costs, computing the net present values, sensitivity analysis, and making a recommendation (Boardman, 2011, 5-15).

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Cost – Benefit Analysis

Specify the Set of Alternative Projects

The first step of the cost-benefit analysis is to identify the set of alternative projects that could be undertaken. There are many possible alternatives that could occur at Ambush Park. The first alternative is to do nothing and leave the unused land as is. That is what has been done in the past, although many people have considered using the land for different projects.

Other alternatives could be to build more campsites or expand the flower garden. Building more campsites is not a good option since the park does not need more sites. Expanding the flower garden may not be the best alternative either. The new flower garden would be in a location where many people like to run around, and there is also no possibility to connect the new flower garden with the existing one, making it harder and more expensive to maintain. Another option would be to build more playground equipment, or to plant more trees, but I do not feel these are good options.

The most feasible options in my opinion are to put in a 9-hole Frisbee disc course, an 18-hole Frisbee disc course, or do nothing and leave the unused land as is. Rural communities are embracing disc golf, and over half of American courses are in non-urban areas (Siniscalchi, 4-5). This would be a great opportunity for the Benson community. I will take a closer look into these alternatives in the following steps.

Decide Whose Benefits and Costs Count (Standing)

The second step is to look at standing, or whose benefits and costs are counted. I think there are three options that we should look at. The first option would be to only include the residents of the City of Benson. The second option would include the residents of Swift County,

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and the third would include the residents of Swift County as well as the surrounding counties, including Stevens, Pope, Kandiyohi, and Chippewa.

To only include the City of Benson residents would leave out the opinion of over half of the overall Benson community, which includes many farmers and other residents living just outside of town, or from several surrounding towns. Although the course would be paid for by the City of Benson, I still believe we need to include a greater amount of users, because the course would be a community resource and we need the entire community to take ownership of the resource. Thus, I do not think this is the best option.

Including the residents of Swift County and the other surrounding counties would not be right either. Yes, they may have access to Ambush Park and use it frequently, but I believe that as a whole they are not using it enough to have a say in what should happen to everyday workings of the park. If we chose to include all of those residents, then you might as well include all of Minnesota because some residents from quite a distance away use the park just as much as the residents from our closer counties. I could find no data on park usage, but I would assume this is the case.

I think the second option of just including the residents of Swift County would be the best option to choose. Swift County includes all of Benson, plus parts of DeGraff, Danvers, Clontarf, Swift Falls, and a few other smaller towns. These are the people that often use the park, although many visitors only visit Ambush Park a few times a year. There are numerous bonfires and community/family gatherings at Ambush Park, and many people in and around the community only venture to the park for these types of activities. With the addition of a Frisbee disc course, I

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hope to change that by enticing more people to visit the park and enjoy the natural beauty and other outdoor activities.

Identify the Impact Categories, Catalogue Them, and Select Measurement Indicators

For simplicity, the impact categories, or the costs and benefits, have been to be divided into categories for each of the possible alternatives. The following tables show the different impact categories for each alternative, along with their units of measurements.

Table 1: Impact Categories			
9 - Hole Frisbee Disc Course		18 - Hole Frisbee Disc Course	
Costs	Benefits	Costs	Benefits
Disc Holes (disc pole holes + locking collar assembly + anchor assembly) = \$355.50 each or \$3,199.50 in total	Brings users to the park (increased purchases of campsites, possible donation box)	Disc Holes (disc pole holes + locking collar assembly + anchor assembly) = \$355.50 each or \$6,399.00 in total	Brings users to the park (increased purchases of campsites, possible donation box)
Concrete (for basket, tee pads, tee signs) = \$76.00 each or \$684.00 in total	Healthy activity (a decrease in health costs for many individuals)	Concrete (for basket, tee pads, tee signs) = \$76.00 each or \$1,368.00 in total	Healthy activity (a decrease in health costs for many individuals)
Tee Pad Form = \$12.00 each or \$108.00 in total	Fun activity	Tee Pad Form = \$12.00 each or \$216.00 in total	Fun activity
Tee Signs = \$60.00 each or \$540.00 in total	More people/business to the community (increased business at pool, Dairy Queen, golf course, and other businesses in the Benson area)	Tee Signs = \$60.00 each or \$1,080.00 in total	More people/business to the community (increased business at pool, Dairy Queen, golf course, and other businesses in the Benson area)
Message Board and Trash Cans = \$740.00	Inexpensive to maintain	Message Board and Trash Cans = \$740.00	Inexpensive to maintain

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Labor Costs (4 hours each basket, 8 hours each tee pad, 1 hour each sign) = 13 hours each hole or 117 hours in total		Labor Costs (4 hours each basket, 8 hours each tee pad, 1 hour each sign) = 13 hours each hole or 234 hours in total	
Maintenance Costs		Maintenance Costs	

For the 9 and 18 hole Frisbee disc courses, the largest costs are purchasing the actual metal baskets and labor time. The source for the prices for all of the major equipment was from the Disc Golf Association (DGA, 2014). I also emailed a man from Discs Unlimited, and his numbers were very similar. Many courses have volunteers set up and maintain their course, and I am sure the Benson community would have no problem doing this. In addition, the City of Benson already mows the area so it would cost very little extra to maintain. Benson is a family-oriented community, and many groups, such as Women of Today, Lions Club, 4-H, and church groups, are very helpful when it comes to community projects. Our town recently updated a mini-golf course at Ambush Park, and the city was able to have volunteers donate all the labor for the project. If I had to come up with a number for the labor costs, though, I would use the current minimum wage rate of \$7.50/hour. I would use this rate because I am sure we could get people to work at that rate to get the job done; otherwise I will personally do it for that amount along with other family members who have already expressed their interest in the project. Because the minimum wage rate is set to increase to \$9.50 as of August 8, 2014, I will be also showing the result of using that rate in my sensitivity analysis. Using the \$7.50 rate, total labor costs for the 9-hole course would be \$877.50 and \$1,755.00 for the 18-hole course.

Disc golf provides players with tangible and intangible benefits (Siniscalchi, 7). Most of

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the benefits are difficult to put into monetary values. Yes, I can calculate the potential benefits of increased campers or added revenue to businesses in the area, even though those values are rough estimates, but it is hard to put a price on fun, enjoyment, better fitness and quality of life, and an overall better feeling and sense of community.

A 9-hole Frisbee disc course, planned and installed by some University of Minnesota – Morris students, was built at Pommel de Terre Park a few years ago. They offered organizations or businesses the opportunity to receive their name on a specific hole, in addition to the message board sign, if they paid \$1,000. The project was able to raise over \$7,200, which was more than enough for all of the signage costs (Livstrom, 2008). The communities of Granite Falls, Montevideo, and Appleton have received similar response to fundraising efforts in their communities when announcing that they planned to construct a Frisbee disc course in their towns. I believe this could be a likely possibility for a course at Ambush Park. The community has recently been working together and donating large amounts of money and time for different school projects, and I think many people would be willing to do this, also. I estimate that we could pull in at least \$500 per hole or about \$4,500 for the 9-hole course or \$9,000 for the 18-hole course. When I think about it, I believe we could get businesses and individuals to sponsor the costs of each hole, and volunteers to set up the course, making the cost of the project virtually zero, but just to be cautious, I will only count on them providing the costs I have estimated. To see how the results may vary, I will be looking further into this in my sensitivity analysis.

Predict the Impacts Quantitatively Over the Life of the Project

The fixed costs of the projects may seem a little high; this may be because this is the only major expense over the entire life of the project. The potential impacts over the entire life of the

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project need to be considered to determine whether the project is worthwhile, or not. We can choose a terminal, or ending, value of 20 years. The University of Minnesota - Morris article was able to justify this terminal value based off of the lifetime use of the equipment (Livstrom, 2008). I will be using this value, but just to be clear, this is an estimate and the eventual lifespan may be shorter or longer than I expect.

For the 9 and 18 hole Frisbee disc course, the fixed costs are basically a one-time deal. The baskets, tee signs, message board, and labor costs are only for the first year. The tee pad costs can be a little tricky. According to an article outlining the steps to installing a new course, many of the maintenance costs depend on whether the holes are mostly in the open or in the woods (PDGA, 2014). Thankfully, in our situation at Ambush Park, all of the holes would be in the open. Hard surface tees may need to have dirt or gravel added in front of the tee box every few years to deal with wear. The tee signs may also need some small maintenance after a few years, including small paint touch-ups, due to all of the weather damage over time. Again, I believe volunteers would be more than happy to help out each year with maintenance. In fact, I would suggest an early "fun tournament" each year where the participants help clean up the course during a practice round the day before the event. I just talked to a man from the St. James area, which added a 9-hole Frisbee disc course two summers ago, who said that they had volunteers help with all of the labor costs. They also have set aside designated times each summer to do a few renovations on the course, all through volunteers (Boeve, 2014). Because of this, instead of \$877.50 in labor costs for the 9-hole course and \$1,755.00 for the 18-hole course, I will predict that at least half of those hours will be volunteer hours, leaving us with values of

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\$438.75 and \$877.50, respectively. To show the volatility of this assumption, it will also be a part of my sensitivity analysis.

The benefits over the life of the project would most likely include decreased health costs in the community, extra campers and revenue to Ambush Park, more people in the community would be utilizing the park, more people from outside the community would spend money in the area, and overall, people would spend more time outdoors in the fresh air.

Monetize (Attach Dollar Values To) All Impacts

In the preceding sections, some of the costs and benefits were given in dollar values. These can be used for calculating impacts over the estimated life of the project. Some of these impacts still need to be put into dollar values though.

Table 2: Impact Categories			
9 - Hole Frisbee Disc Course		18 - Hole Frisbee Disc Course	
Costs	Benefits	Costs	Benefits
Disc Holes = \$3,199.50	Brings users to the park = \$440.00	Disc Holes = \$6,399.00	Brings users to the park = \$440.00
Concrete = \$684.00	Healthy activity	Concrete = \$1,368.00	Healthy activity
Tee Pad Form = \$108.00	Fun activity	Tee Pad Form = \$216.00	Fun activity
Tee Signs = \$540.00	More people/ business to the community = \$1,000	Tee Signs = \$1,080.00	More people/ business to the community = \$1,000
Message Board and Trash Cans = \$740.00	Inexpensive to maintain	Message Board and Trash Cans = \$740.00	Inexpensive to maintain
Labor Costs (with volunteer help included) = \$438.75	Businesses advertising = \$4,500	Labor Costs (with volunteer help included) = \$877.50	Businesses advertising = \$9,000
Maintenance Costs = \$50 every 3 years		Maintenance Costs = \$100 every 3 years	

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The fixed costs all have monetized values for them. The disc holes should last for 20 years, so I am basing my numbers off that estimate. The baskets, concrete, and tee pad form should be set to last for that entire period. The tee signs, message board and trash cans, and therefore, the labor costs, will need to be updated. They will all need to be updated about every three years, so I will plan on updating them a total of six times for the life of the project.

Businesses will have the opportunity to pay \$500 - \$1,000 for their name to be put on the tee signs and message board. This should generate a minimum of \$4,500 for a 9-hole course and \$9,000 for an 18-hole course. I am also optimistic of generous community support, and I expect that at least half of the labor time/costs will be volunteers.

Some of the benefits have already been monetized. For the remaining benefits, revenue brought in by the increased number of campers plus a donation box and more people to the community spending more money, I have values of \$440.00 and \$1,000. For the revenue from campers, the price of an average campsite is roughly \$20.00 a night (City of Benson, 2014). An estimate of two new campsites booked each weekend of the summer (May through September) would be about 22. Therefore, 22 new customers paying the \$20.00 gave us a value of \$440.00. A donation box would also be at the park. In addition, some communities have instituted a nominal fee, such as \$1, for out of county users (Siniscalchi, 9). I am not sure enough of this value, although it will be some positive number, to include it in the cost-benefit analysis.

There will also be increased purchases in the community with the additional people coming to play. The golf course, pool, and Dairy Queen are right next to the park, and they would all be places that would benefit greatly by a Frisbee disc course at Ambush Park. An

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estimated \$200 per month for each of the summer months would give us increased revenue in the community of \$1,000 per year, although I feel this amount could increase greatly for each of the first few years the course is open. This is a rough estimate based off of the price of green fees, swimming pool admission rates, and Dairy Queen prices. I do not think the additional \$1,000 made in revenue from the community businesses or the \$440 made in campsite revenue would differ much for the 9 or 18-hole course, and I feel these are minimum estimates. This is my personal assumption. To show how it could differ, I will show a difference in my sensitivity analysis.

For the alternative option of doing nothing, the costs and benefits should not change much from what they are now. All we have now is an empty grassy play area that is underutilized. There are no costs that will be added to this area in the future. There will also not be any benefits added to this area in the future because you cannot exactly expand when you have nothing to expand with. The only possible added benefit would be the possible option of using this land in a different way in the future. This would need to be done in a completely different cost-benefit analysis.

Discount Benefits and Costs to Obtain Present Values

A main debate in cost-benefit analysis is the issue of the discount rate. Using a discount rate, we can take a look at values in the future and put them into terms of present value. This is important because there is an opportunity cost to the resources used in a project and most people prefer to consume now rather than later (Boardman, 2011, 12). When looking for the right discount rate, we need to consider the marginal rate of return on private investment and the marginal rate of time preference for savers. The MRRPI reflects the return needed to justify the

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cost of borrowing; it is the upper bound. The MRTPS reflects the maximum interest rate at which a person will borrow to obtain an extra dollar; it is the lower bound (Boardman, 2011, 249-253). It is justified to pick a discount rate in the middle of these two results since it shows the different actions of both consumers and investors. I will be using a discount rate of 3% because Martin Weitzman stated that for projects that are 6 to 25 years in the future, this is an appropriate discount rate (Weitzman, 2001, 270).

This discount rate will be used to calculate the present values for the two alternative projects. The formula for the present values of the costs and benefits are

$$PVC = \sum_{t=1}^{t=n} \frac{C_t}{(1+i)^t} \qquad PVB = \sum_{t=1}^{t=n} \frac{B_t}{(1+i)^t}$$

where n = number of years being considered, t = each individual year, and i = the discount rate expressed as a decimal fraction (Putt, 1987).

If we add up the fixed costs of the 9-hole project, we get \$5,710.25. This value needs to be discounted because it would be occurring next summer, or a year from now. To discount, take \$5,710.25/(1 + r). The value of r is the discount rate, or 0.03. That value would then become \$5,543.93. The maintenance costs of \$50 need to be discounted at years 4, 7, 10, 13, 16, and 19. To get this value, take \$50/(1 + r)⁴ + \$50/(1 + r)⁷ + ... + \$50/(1 + r)¹⁹. This cost in present value terms is \$216.00. These prices seem to match up with Jason Siniscalchi's paper. According to his work, courses are easily constructed, costing a local community approximately \$500 – 1,000 per hole. The average cost to develop a course is under \$8,000 (Siniscalchi, 8).

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The benefits of the project before discounting are \$4,500 plus \$1,440 in the first and each additional year of the project. The business advertising benefit needs to be discounted for a year from now, to get a value of \$4,368.93. The benefits of increased business in the community and in campsite reservations discounted over the 20-year lifetime is \$21,423.56.

If we add up the fixed costs of the 18-hole project, we get a value of \$10,680.50. The present value of this is \$10,369.40. The maintenance costs will also need to be discounted, just like the 9-hole course. This discounted value is \$432.01.

The benefits of the project before discounting are the total advertising prices that businesses pay, \$9,000, plus the \$1,440 in the first and each additional year of the project. The \$9,000 would become \$8,737.86 by discounting, and the increased revenue from more purchases in the community and in campsites would also be \$21,423.56.

Table 3: Present Value of Costs				
Costs	9-Hole Course (Not including maintenance costs)	Maintenance costs (9-Hole)	18-Hole Course (Not including maintenance costs)	Maintenance costs (18-Hole)
Before Discounting	\$5,710.25	\$300.00	\$10,680.50	\$600.00
After Discounting	\$5,543.93	\$216.00	\$10,369.40	\$432.01

Table 3 shows the present value of costs for the 9 and 18 hole courses.

Table 4 shows the present value of benefits for the 9 and 18 hole courses.

Table 4: Present Value of Benefits

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Benefits	9-Hole Course (Only including business advertising)	Increased business and campsite reservations (9- Hole)	18-Hole Course (Only including business advertising)	Increased business and campsite reservations (18- Hole)
Before Discounting	\$4,500.00	\$28,800.00	\$9,000.00	\$28,800.00
After Discounting	\$4,368.93	\$21,423.56	\$8,737.86	\$21,423.56

Compute the Net Present Value of Each Alternative

Computing the net present value of each alternative is very important. The basic decision rule for alternative projects (relative to the status quo) is simple: adopt the project if its net present value is positive, and then select the project with the largest net present value if more than one alternative is positive (Boardman, 2011, pg. 13).

The formula for net present value is

$$NPV = \sum_{t=1}^n \frac{B_t - C_t}{(1+i)^t}$$

according to (Putt, 1987). It is essentially the two formulas for present value combined into one, or put another way, the present value of benefits minus the present value of costs.

For the 9-hole Frisbee disc course, our present value of one-time costs is \$5,543.93. We can add in our maintenance costs of \$216.00. Thus, our total present value of costs is \$5,759.93. Our present value of one-time benefits is \$4,368.93. Our benefits that will occur each year are \$21,423.56. Our total present value of benefits is \$25,792.49. Overall, the net present value for the 9-hole Frisbee disc course is \$20,032.56.

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The 18-hole Frisbee disc course has a one-time present value cost of \$10,369.40. The present value of maintenance costs is \$432.01, giving a total present value of costs to be \$10,801.40. The one-time present value of the benefits is \$8,737.86. Additional benefits that occur each year are \$21,423.56, for a total present value of benefits equal to \$30,161.40. So overall, the net present value for the 18-hole Frisbee disc course is \$19,360.02.

Perform Sensitivity Analysis

The last real step in a cost-benefit analysis is to vary the uncertain parameters in the projects, and then see if the results change. If the same outcome occurs every time, even though you are changing the inputs, the project is not very sensitive. This is a result that everyone would enjoy seeing because it should give everyone more confidence in the final decision.

One of the most important aspects that should be varied is the discount rate. This will have a direct impact on your final net present value calculation. Because of this, I will be varying the discount rate by 1% each way. Table 5 shows the net present values that will be obtained with the various discount rates of 2%, 3%, and 4%.

Table 5: Net Present Values Assuming Concrete Tees			
	2% Discount Rate	3% Discount Rate	4% Discount Rate
9-Hole Course	\$22,119.41	\$20,032.56	\$18,211.42
18-Hole Course	\$21,418.23	\$19,360.02	\$17,564.31

In table 6, I will be also looking at the option of having natural tees versus hard surface tees. Natural tees would have a much cheaper tee box cost. The cost would be close to nothing (about \$25 per hole), except for the labor, which I would estimate to be about 1 hour per hole, or 9 hours for a 9-hole course, or 18 hours for an 18-hole course. I will base the labor costs at \$7.50

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per hour with half of this time coming from volunteers. These would also need to be updated every few years so the maintenance values would not change.

Therefore, the change in fixed costs would be a decrease of \$68 per hole in concrete costs for a total of \$612 for a 9-hole course and \$1,224 for an 18-hole course. Labor costs would also be cut drastically. An estimated 7 hours per hole could be cut for a total of \$236.25 and \$472.5. We would also need to add on the additional \$25 per hole.

Adding these numbers together, before discounting for the 9-hole course, the costs change to \$4,979 plus the additional maintenance costs. And, for the 18-hole course, the costs are now \$9,218 plus the additional maintenance costs.

Table 6: Net Present Values Assuming Natural Tees			
	2 % Discount Rate	3% Discount Rate	4% Discount Rate
9-Hole Course	\$22,836.36	\$20,742.50	\$18,914.59
18-Hole Course	\$22,852.10	\$20,779.90	\$18,970.60

Table 7: Net Present Values With Changes in Wage Rate, Volunteer Help, and Advertising Benefits (9-Hole Course)			
Costs/Benefits	Normal Benefits	½ Advertising Benefits	No Advertising Benefits
Normal Costs (\$7.50 wage rate)	\$20,248.60	\$18,064.10	\$15,879.63
Normal Costs (\$9.50 wage rate)	\$20,134.97	\$17,950.51	\$15,766.04
No volunteer help (\$7.50)	\$19,822.59	\$17,638.13	\$15,453.66
No volunteer help (\$9.50)	\$19,595.40	\$17,410.94	\$15,226.47

Throughout the paper, I made many assumptions, including the possible money brought in by

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advertisers paying for signs, volunteer help, and increased revenue earned by businesses. I also did my previous net present value calculations based on wage rates of \$7.50 instead of \$9.50. In table 7, I take a look at the changes in net present value based on changes in the wage rates, volunteer help, and advertising benefits for the 9-hole course.

Table 8 shows the changes in net present value for the 18-hole course based on changes in wage rates, volunteer help, advertising benefits, and a change in revenue earned by businesses. For the change in revenue earned, I increased the revenue up from \$1,000 to \$1,500 for the 18-hole course.

Table 8: Net Present Values With Changes in Wage Rate, Volunteer Help, Advertising Benefits, and Revenue Earned (18-Hole Course)						
Costs/Benefits	Normal Benefits	½ Advertising Benefits	No Advertising Benefits	Normal Benefits (Change in Revenue Earned)	½ Advertising Benefits (Change in Revenue Earned)	No Advertising Benefits (Change in Revenue Earned)
Normal Costs (\$7.50 wage rate)	\$19,792.00	\$15,423.09	\$11,054.16	\$30,503.81	\$26,134.88	\$21,765.95
Normal Costs (\$9.50 wage rate)	\$19,564.80	\$15,195.89	\$10,826.96	\$30,276.61	\$25,907.68	\$21,538.75
No volunteer help (\$7.50)	\$18,940.04	\$14,571.13	\$10,202.20	\$29,651.85	\$25,282.92	\$20,913.99
No volunteer help (\$9.50)	\$18,485.67	\$14,116.76	\$9,747.83	\$29,197.48	\$24,828.55	\$20,459.62

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Make a Recommendation

Based on the different steps I have taken, along with the sensitivity analysis I have just performed, I recommend building a 9-hole Frisbee disc course at Ambush Park. Looking at the alternatives, I could easily eliminate the option of doing nothing after calculating the net present values and performing the sensitivity analysis. The net present values were quite large for the 9-hole and 18-hole Frisbee disc courses, and this is without including many of the possible benefits that I did not monetize, such as the added fun and health benefits of disc golf.

The choice between the two alternative projects was difficult. Their net present values were close in all of the sensitivity analyses. Looking at table 5, when the projects use the concrete tee boxes, it really does not matter what discount rate we use; we should choose to put in a 9-hole Frisbee disc course. Looking at table 6, we see a different outcome. Using the natural tees, and still varying the discount rates, we should pick to build an 18-hole Frisbee disc course. Overall, the net present values are more positive when using the natural tees, obviously. Comparing table 7 and table 8, the 9-hole course has the slight advantage in NPV, except for when there is a change in the increase revenue earned by businesses.

I would recommend building the 9-hole Frisbee disc course, instead of the 18-hole course, because I would not plan on using natural tee boxes. I think the people who are real Frisbee golf enthusiasts appreciate the added touch of nice tee boxes that offer better footing, safety, and a dependable surface to push off of while throwing the Frisbee disc. Frisbee disc enthusiasts would find a reason to check out the course during a visit to Benson, and current residents of the community can use the tee boxes to help them better navigate the course when

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trying it out for the first few times. Natural tee boxes can also become very muddy and dangerous, making for potential liability issues for the city. In addition, if the 9-hole Frisbee disc course is successful, nine more holes can be added in the future. I would also not count on the increased revenue earned from the 18-hole course compared to the 9-hole course. I think the course would bring in roughly the same amount of people whether it was 9 or 18 holes. Therefore, they should both have the same increase in revenue made by local businesses.

Overall, this cost-benefit analysis is to make a recommendation and not a decision. Many of my monetized values are estimates and could be off one direction or the other. I hope this will give a little bit of an insight into what are the main options the Benson community has for the unused land at Ambush Park, and will push them to do something beneficial with it.

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Works Cited

Boardman, Anthony E. Cost-Benefit Analysis. Upper Saddle River, NJ: Prentice Hall, 2011.

Print.

Boeve, Keith. (2014, April 12). Personal communication.

"Camping and Shelter Reservations." *City of Benson*. Web. 12 Apr. 2014.

"Course Development." *PDGA*. Professional Disc Golf Association, 2014. Web. 06 Apr. 2014.

"Disc Golf Course Design Economic Summary." *DGA*. Disc Golf Association, 2014. Web. 06 Apr. 2014.

Livstrom, Jesh. "Pomme De Terre Disc Golf Course Opens." *University of Minnesota Morris*.

Regents of the University of Minnesota, 08 May 2008. Web. 06 Apr. 2014.

Putt, S.N.H. "Economics and Decision-making in Disease Control Policy." *Veterinary*

Epidemiology and Economics in Africa. FAO, 1987. Print.

Siniscalchi, Jason M. *The Personal and Community Benefits of Disc Golf to Rural America (and Beyond)*. Working paper. Web. 10 Apr. 2014.

Weitzman, Martin. "Gamma Discounting." *The American Economic Review* 91.1 (2001): 270.

Web. 29 Apr. 2014.